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VIEWS, NEWS AND INTERVIEWS.

"Two farmers were discussing the tariff," said Dr. Chauncey M. Depew, in a recent campaign speech. "One said horses were cheap because of the new tariff. The other maintained that the tariff had nothing to do with it; that trolley cars and bicycles were doing away with horses. 'That may be,' said the other farmer, 'but even the Government at Washington has no use for horses, for everything down there is being run by jackasses.'"

Japan has cheaper telegraph rates than any country in the world, provided the Japanese language is used.

Dr. W. R. Huntingdon, rector of Grace Church, New York, has ordered a chime of 10 bells, aggregating 11,000 pounds, for the new Grace Chapel and Hospital on East Fourteenth street. The chime will be played by electricity. The bells, it is expected, will be in place within three months. The chime will cost $6,000.

A correspondent writes to the ELECTRICAL REVIEW as follows:

Did you ever hear the conundrum "Why is an electric power house like heaven?" The answer is "Because it's a dynamo (die-no-mo') place."

Did the Englishman singing "'Ome, 'Ome, Sweet, Sweet 'Ome" have any reference to electrical affairs?

Among the letters to the editor in the current issue of London *Lightning* the following appears:

A CORRECTION.

To the Editor of LIGHTNING:

DEAR SIR: I observe in the current number of LIGHTNING that, in an account of the opening of the Medical Schools of the Yorkshire College, my name was erroneously printed—I am, dear Sir, your obedient servant, T. HARDING CHURTON.

[We regret the misprint.]

Isn't that delicious? The editor's heading and comment is worthy of the New York *Sun*.

"Fifteen years ago, in Topeka, Kansas," remarked an old-timer, "there was a great cottonwood tree that stood within the sidewalk line in Kansas avenue, between Fifth and Sixth streets, one of the most attractive business quarters of the city. Its history, confirmed by all old residents, was that it had originally been a telegraph pole, set there when the wires first came to the city, and, ignoring the purpose the linemen had in view, and feeling itself planted in fertile Kansas soil, took root, put forth branches, and, like 'Topsy,' 'growed.' Its foliage darkened several office and store fronts, and its branches in their exuberant growth were constantly threatening to break window glass and push down walls, but the sentiment in favor of its preservation was so strong that it was protected until through decay it became necessary to cut it down."

It is stated that Thomas A. Edison has already expended nearly $1,000,000 in his experiments to find a commercial method of reducing low grade ores by electricity. Should he finally succeed he says it will be his greatest electrical invention.

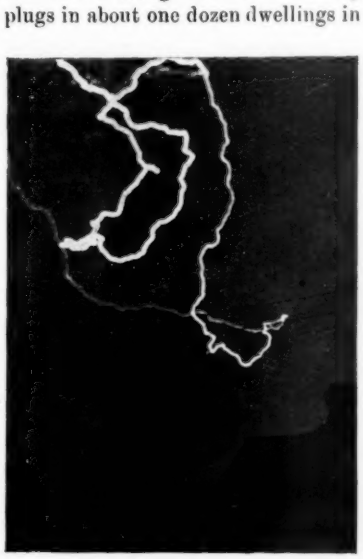
On election night the New York *Herald* had a big canvas stretched on the front of its up-town building, on which frequent bulletins were thrown by a stereopticon located in a wagon across the street. An electric light was used in the stereopticon and wires running from the roof of the building to the wagon furnished current from the *Herald's* isolated plant. A man was overheard explaining to a friend how the thing worked. "You see those wires?" he said. "Well, that's a telegraph line. When they get the returns in the building they just telegraph 'em over to the feller in the wagon and he puts 'em in the magic lantern and that shows 'em on the sheet. Great, ain't it?"

Attorney-General Ellis has declined to permit the city of Detroit to institute proceedings to test the validity of the Detroit Street Railway Company's franchise for the use of the streets of that city. He says the State cannot be made a party to correct the mistakes made by a municipality when the transaction is not tainted by fraud.

Lightning Strikes a Lighting Circuit.

TO THE EDITOR OF ELECTRICAL REVIEW:

I enclose herewith a photograph taken during a thunder storm by Richard Rea, a young man of this city. The picture was taken about nine o'clock P. M. The bolt struck the neutral wire on a low tension three wire system. The only damage was the blowing out of the safety plugs in about one dozen dwellings in the immediate vicinity of where the bolt struck.



BOLT OF LIGHTNING STRIKING A LIGHTING CIRCUIT.

Perhaps this picture may be of interest to your readers, and you have permission to publish it.

Yours truly,
JOSEPH FLESHEIM.
Menominee, Mich., Oct. 27, 1894.

General Electric Company Increases Its Plant.

The General Electric Company has advertised for plans and specifications for two new buildings to add to its extensive plant in Schenectady, N. Y. When the bids have been examined and accepted the contract will be let at once for the erection of the structures with all reasonable expedition. These new buildings will be a storehouse, 350x52 feet and a laboratory.

The Telephone in War.

General Greely, chief of the signal service, in his annual report to the Secretary of War, makes interesting reference to the use of the telephone in modern warfare, with especial reference to the war now in progress in the East.

"All late wars," he says, "and especially the one now waging between Japan and China, indicate that electrical connections are indispensable to the success of any army operating on a base apart from the general telegraphic system. Appreciating this fact, the work of the signal corps for the past few years has been given to experimental work in the equipment of its flying telegraph lines, so that it may be ready for any possible emergency, and the system is so arranged that it looks to performing temporary telephonic service, whether between headquarters of a regiment and separate companies, or an army and its different divisions, and whether such operations pertain to garrison, camp or actual conflict."

General Greely records the marvelous success which has resulted from experiments in the army with the single uninsulated bimetallic wire lying on the ground in wet grass, when a whispered conversation was conducted through telephones half a mile apart. When the wire was partially buried the telephone could not be held close to the ear without discomfort. As showing the danger of reducing appropriations for the signal corps, he cites the significant instance in the current accounts of the present Corean war, where it was mentioned incidentally that the day following the battle of Ping Yang the Japanese Signal and Telegraph Corps ran into that city a flying telegraph line extending from Seoul, a distance of 70 miles. The experiences of the Army of the United States last year showed that several military departments had to be stripped of their signal sergeants and telegraph material to enable a similar length of line to be constructed in the valley of the Rio Grande.

The signal corps is already experi-

menting with a great military balloon, which has had many successful ascensions, and General Greely's corps "has endeavored to keep advised as to practical advance in the construction of dirigible baloons and æroplanes, but nothing has developed during the year that points to the speedy solution of air navigation.

"The experiences of the past year," he says, "prove that the utility of the captive balloon is not confined to the open country, but on occasions it may be of supreme importance in connection with operations in the great cities. The great modern city, with its solid blocks of compact buildings extending for many miles, presents unusual facilities for speedy and undisturbed change of base on the part of bodies of lawless and riotous men engaged in committing depredations and in destroying property. The extreme difficulty of overcoming riotous bodies within the limits of a large city was strikingly exemplified in Paris by the Commune insurrection, where for weeks an inferior body of ill disciplined and poorly equipped men successfully resisted the most determined efforts of a superior force of regulars. Within the past year the troops of our own army, called upon to assist the civil authorities, found themselves marching miles of distance to repress riotous proceedings, while the body of men sought for had accomplished its end and was already moving undisturbed and unobserved to another objective point. Under such conditions the operation of a captive balloon, provided with electric and telephonic connection with the commanding general, offer an unequaled means of observing and instantly reporting the movements of the hostile rioters, who would thus be under the surveillance of the commanding general, enabling him to act with promptness and effect."

Waring Sues Westinghouse for $1,000,000.

R. S. Waring, at Pittsburgh, on November 10 entered suit against George Westinghouse, Jr., asking for an accounting of 10,000 shares of Standard Underground Cable stock, par value $1,000,000. The bill states that in 1886 the Standard Underground Cable Company, in order to secure the support of Mr. Westinghouse, contributed 5,000 shares of stock to Westinghouse's benefit, and in addition to this the plaintiff placed 10,000 shares of his own stock in the name and control of Westinghouse. Waring charges that Westinghouse, instead of using the stock for the benefit of the company, sold it regardless of the purpose for which it was given and used it so as to turn the plaintiff out of his offices in the company. Waring charges that Westinghouse refuses to give an accounting and asks that the court compel the transfer of undisposed stock back to him, and an accounting for the rest.

The Standard Underground Cable Company was at one time among the prominent wire and cable manufacturing companies, but of late has not been conspicuous in this field, and the real value of the stock is not known.

Test of a Magnetic Blow-Out.

An interesting experiment was recently made at the Kent avenue station of the Brooklyn, N. Y., City Railroad Company to test the efficacy of the magnetic blow-out principle in the fuse carriers which form part of the General Electric Company's generator equipments. Previous to the test there had been, on the part of the railroad company, no little skepticism as to the value of the magnetic blow-out principle, and the test was made with the view primarily of proving the correctness of the claims of the manufacturing company that the apparatus would cope with almost any demand made upon it.

The test was made on the company's dock, behind the station, under the supervision of Mr. Walter A. Pearson, superintendent of the station. Six water rheostats of large capacity were connected into the circuit in series in order to regulate the load and, the conductors were brought directly from two of the four 1,500 kilowatt multipolar generators. The fuse blew at 4,400 amperes at 550 volts, an equivalent in horse-power of 3,243 horse-power. The result of the test was a complete demonstration of the efficacy of the magnetic blow-out on a very powerful and destructive arc. The cut shows the blown fuse and one of similar capacity intact. It will be seen that the action of the magnetic blow-out must have been instantaneous, and, perhaps, the most remarkable feature is the small amount of metal blown.

The magnetic blow-out principle is a special characteristic of all apparatus manufactured by the General Electric Company, which has to deal with possible arcs. It is successfully embodied in the well-known "K" car controller as well as in the lightning arresters, fuse-boxes, etc. It is claimed to be the only known method of preventing destructive arcing, and is protected by undisputed patents. The fuse box, in which the fuse shown in the cut was blown, was exhibited at the Atlanta Convention and served to convince many who had doubted the efficacy of the magnetic blow-out principle.

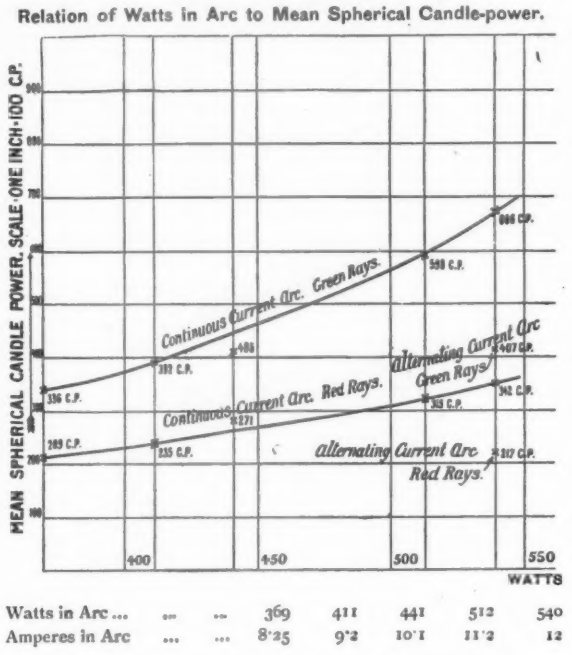


FIG. 1.—CONTINUOUS AND ALTERNATE CURRENT ARCS.

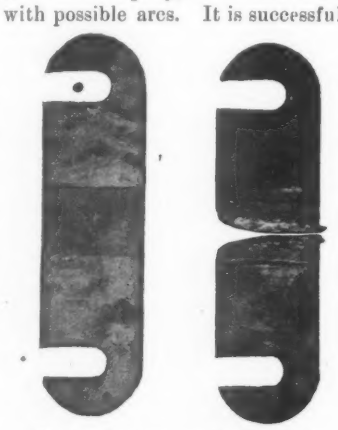


FIG. 1.—INTACT AND BLOWN FUSES.

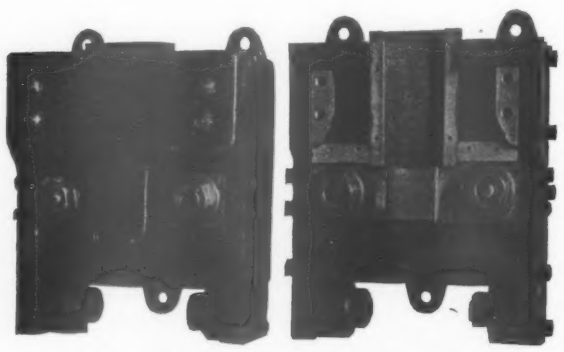


FIG. 2.—FUSE BOX FOR MAGNETIC BLOW-OUT.

ELECTRIC RAILWAY NOTES.

The annual report of the West End Street Railway Company, of Boston, will be ready for issuance in a very few days.

The Ohio Supreme Court has affirmed the constitutionality of the law requiring electric cars to be provided with substantial vestibules to protect the motormen from the weather in Winter.

Sidney Cushing, Edward F. Wilder and others have filed a petition with the Hingham, Mass., selectmen for a franchise for an electric railway through the streets of the town to the Weymouth line. A hearing is fixed for November 17. This project is part of a scheme in which Hull, Weymouth and Boston people are interested for the construction of a new line to Nantasket Beach with connections to East and South Weymouth. More or less opposition is being developed, especially in Hingham. If, however, the franchises desired are secured and the line is built it will make it possible for people residing in almost every portion of southeastern Massachusetts to reach Nantasket Beach by electric cars.

The West End Street Railway Company, of Boston, has nearly completed the construction work projected for this year, and is preparing for the cold weather. Nearly all its cars have had the window casings put in, and most of the motors on the open cars have been transferred to the box cars. The only construction work laid out for this year and not yet undertaken is the extension of the Mount Bowdoin line in Dorchester for about one-half a mile. The work changing from horse to electric traction in East Boston is nearly completed. The trolley wire is strung, the four or five miles of feed wire are being run, the power house is practically finished, the boilers are in and set, the stack is up and the engines are in place. The generators have not yet been received, but will be soon, and when they are set up and have been running two or three weeks and found to be in working order the cars will be started, which will probably be about the middle of December. The car house was completed last week. The frame is up for the car house on Sewall place, at the end of the Cypress street line in Brookline, the track has been extended up to it and it is only the work of a few days to run the wires to the building. In will be in use before New Year's. The addition to the Reservoir car house is nearly completed.

A Washington-Baltimore Electric Railway.

The Widener-Elkins-Dolan-Hambleton-Newbold syndicate, of Philadelphia, are now completing arrangements for an electric railway between Baltimore and Washington, and the line is expected to be in operation within the next 18 months. It proposes to run a close schedule, and a speed of 40 to 60 miles an hour will be maintained. Bonds will be sold to the public, but the syndicate will hold the control of the stock.

PERSONAL.

Mr. Parsons, of the Davidson Ventilating Fan Company, Boston, was in New York last week.

Mr. C. J. H. Woodbury, of the American Bell Telephone Company, Boston, was among last week's visitors to New York.

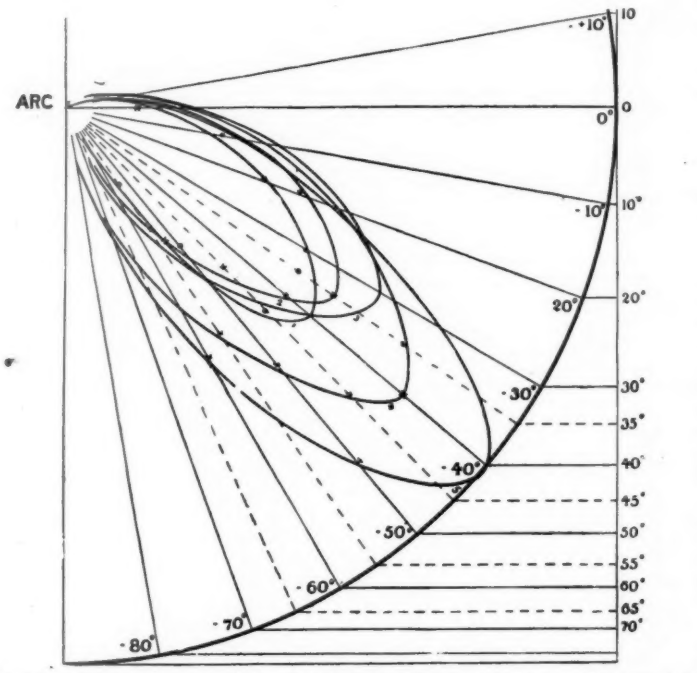


FIG. 2.—CONTINUOUS CURRENT ARC. PHOTOMETRIC CURVES FOR VARIOUS ELECTRICAL POWERS IN THE ARC. RUBY-RED RAYS.

Mr. J. H. Rhotehamel, of the Columbia Incandescent Lamp Company, St. Louis, has been in New York for a week arranging to open a branch office.

Mr. C. A. Bragg, manager of the Westinghouse Electric and Manufacturing Company's Philadelphia office, was among the visitors to New York last week.

Mr. J. G. Bloomer, late manager and for 11 years with the California Electrical Works, has joined the firm of Holtz & Fey, electrical manufacturers, of 39 Stevenson street, San Francisco, Cal.

A letter for Mr. C. W. Price, formerly division superintendent of the Baltimore and Ohio Telegraph Company, is held at this office. If Mr. Price will send his address we shall be pleased to forward the letter to him.

MacClymont-Vail.

The engagement of Prof. William E. MacClymont, of Plainfield, N. J., to Miss Catherine A. Vail, of Westfield, N. J., daughter of J. H. Vail, president of the Electrical and Mechanical Engineering and Trading Company, of New York, is announced.

David Young, general manager of the Consolidated Traction Company, last week informed the Mayor of Jersey City that in compliance with the Mayor's request the company had decided to equip all of its cars with safety fenders. The cars on all the lines in Jersey City will be provided with fenders before the close of the year.

CONTINUOUS AND ALTERNATE CURRENT ARCS.

BY PROF. J. A. FLEMING IN "LONDON LIGHTNING."

A difference of opinion seems still to exist as to the relative advantages of the continuous and the alternate current arc, as regards efficiency of illumination, and as any protracted uncertainty is likely to have a deterrent effect upon municipal bodies and other intending users of arc lighting on a large scale, it may be useful to publish an account of certain experiments bearing on this question which were made by the writer during the months of October and November, 1890, by kind permission of Messrs. Johnson and Phillips, at their works at Charlton. The object of these experiments was to obtain some trustworthy data on which to base an opinion as to the relative efficiency in candle-power of one and the same form of arc lamp, when supplied with alternating or continuous current. In order to eliminate any difference that might be due to the working of the arc lamp itself, a form of Brockie arc lamp was prepared for these experiments by Mr. Brockie, having a series coil, but no shunt coil, and arranged to be worked at pleasure, either off a continuous current Kapp dynamo, or on a large alternating current machine. The lamp was suspended from the roof of the foundry, so that it could be raised or lowered to any height by tackle.

A special form of photometer was prepared for the purpose of measuring the intensity of the light at any inclination to the horizon. This photometer consisted of a wooden tube, lined with black velvet, having near the middle a Bunsen grease-spot disk; on one side of the disk a small five candle-power incandescent lamp was made to slide; this lamp was furnished with current from a few cells of a secondary battery, and an ammeter and voltmeter measured the current and volts supplied thereto. It was most carefully standardized against certain known standards of light for various currents, and a curve was constructed to enable the candle-power of the lamp to be at once determined from the current passing through it. This standard of light was re-calibrated at intervals during the experiments. The wooden tube was arranged so that it could be tilted like a telescope, and, by means of a graduated scale, the angle at which the tube was tilted could be seen. The photometer was mounted on a carriage so that it could be moved to different distances from the arc lamp, and the arc lamp, as stated above, could be elevated at various heights above the ground. Two simple measurements, therefore, sufficed to determine the distance of the photometer disk from the arc and the inclination to the horizon at which the measured ray was coming away from the arc. In series with the leads to the arc lamp was placed a Siemens dynamometer and a standard Cardew voltmeter was connected by means of two brass clips to the upper and lower carbons so as to measure the volts across the arc.

In other cases a Siemens wattmeter was used to measure the whole power supplied to the arc, the voltmeter coil being connected to the two carbons, so as not to take account of any expenditure of energy in the mechanism of the lamp, but merely to measure the power being taken up actually in the arc itself. In all experiments 13 millimeter carbons were employed. In the case of the continuous current experiments a cored carbon for the top or positive and a solid carbon for the negative were used; with the alternate current arc experiments cored carbons were used for both top and bottom. In order to eliminate differences in color between the incandescent lamp standard and the arc, screens, consisting of two carefully selected glasses, one being a ruby-red and the other a signal-green, were employed to cut off a given range of the spectrum. In the case of the alternating current arc lamp the photometry is rendered difficult by reason of the fact that the ray intensity in any direction seems to go through a regular cycle, increasing to a maximum and decreasing again to a minimum. The cycle occupied apparently three or four seconds; the mean value, however, between these two extremes was taken for the average ray intensity. These observations numbered many hundreds, having been taken both for the continuous current and the alternate current arc lamps, and the mean results are indicated in the diagram Fig. 1. During each experiment the power in watts supplied to the arc was kept as nearly constant as possible. From the observations obtained at any one given power the mean spherical candle-power at that "wattage" for the red or green rays could be calculated.

The meaning of the term "mean spherical candle-power" may be explained as follows: Suppose we have an arc lamp burning in the center of a spherical room, and that we divide the area of the sphere into zones of equal illumination, and measure the intensity of the light falling on each zone, then the sum of the products of these intensities multiplied into the area of the zone so illuminated gives the total quantity of light falling on the whole sphere, and, if this be divided by the surface of the sphere, the quotient is called the "mean spherical candle-power." This must be stated for a particular colored ray, as the mean intensity is different for the different rays in the arc. Without entering fully into the difficult question of arc photometry it may be stated that, for the purpose of these experiments, comparison was always made for certain particular rays, and we shall, therefore, speak of the mean spherical candle-power for some particular color, say ruby-red or signal-green rays. All such expressions as "nominal candle-power," so often used, are perfectly meaningless.

The mean spherical candle-power, corresponding to different "wattages," having been calculated for the red and green rays in the arc, a series of curves was constructed, showing, first of all, the relative distribution of the light corresponding to the

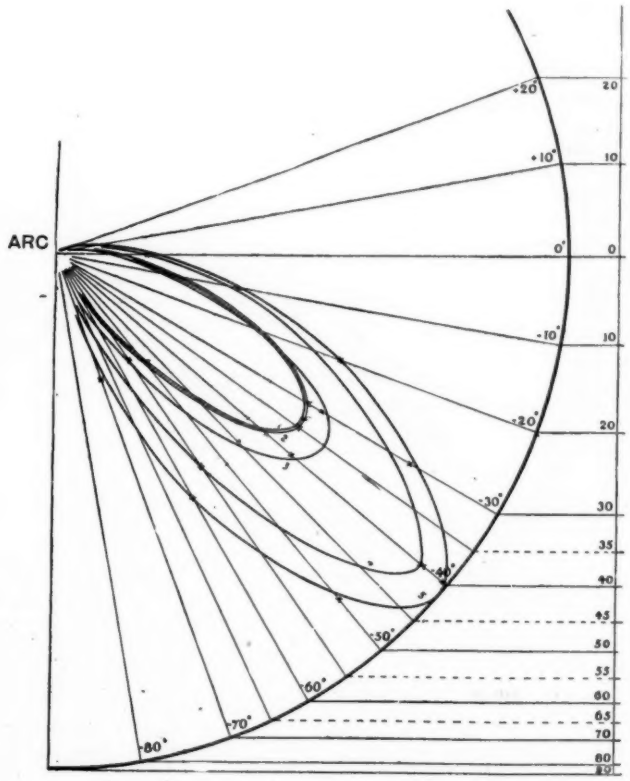


FIG. 3.—CONTINUOUS CURRENT ARC. PHOTOMETRIC CURVES FOR VARIOUS ELECTRICAL POWERS IN THE ARC. SIGNAL-GREEN RAYS.

wattage at different inclinations to the horizon (see Figs. 2 and 3), both for the red and for the green rays. Also another set of curves was constructed, showing the variations in mean spherical candle-power, corresponding to different values of the power in watts given to the arc (see Fig. 1). For instance, in four experiments with the continuous current arcs, the arcs were supplied respec-

tively with 369, 411, 512 and 540 watts, and the curves in Fig. 1 show the variation in mean spherical candle-power corresponding to these various powers. The curve for the red rays is approximately a straight line, but the curve for the green rays bends upwards. The experiments with the alternating current arc lamps were, as above observed, much more difficult on account of the fluctuation in the light of the arc. The alternate current arc appears to revolve round a vertical axis; as a result, the amount of crater area exposed to the eye placed in any position varies, but by taking the mean illumination of the disk in any given direction one good set of observations was obtained, corresponding to 540 volts expended in the arc, and the result was to show that, for a given continued expenditure of power in the arc, the mean spherical power for alternating current is less than that for continuous current, in about the ratio of two to three. Thus, corresponding to 540 watts for the continuous current, the mean spherical candle-power of the red rays was 342, and of the green rays 686, whereas for the alternating current the mean spherical candle-power of the red rays was 217, and of the green 407.

Want of time and other matters prevented the writer from obtaining a series of observations for the alternate current arc at different powers, as in the case of the continuous current; but he proposes to continue these experiments very shortly and obtain, if possible, a careful comparison between the two arcs for a considerable range of powers.

It has been recognized that the alternate current arc lamp has an inductive resistance under certain conditions, especially when hissing, and that the mean spherical candle-power taken up in the arc cannot, therefore, be obtained by multiplying together the product of the amperes and volts, but must be obtained with a wattmeter exactly as if the power had been taken up in a transformer of light load. One point that may be noted with regard to the curves in Figs. 1 and 2 is that the maximum intensity of the arc for different wattages does not always occur in the same direction; this, however, is only what might be expected, because the direction in which the maximum intensity occurs is determined by the position in which the maximum area of crater is seen; and as the crater area increases almost proportionally to the power given to the arc, it is easy to see that the maximum area of crater may be seen in different directions.

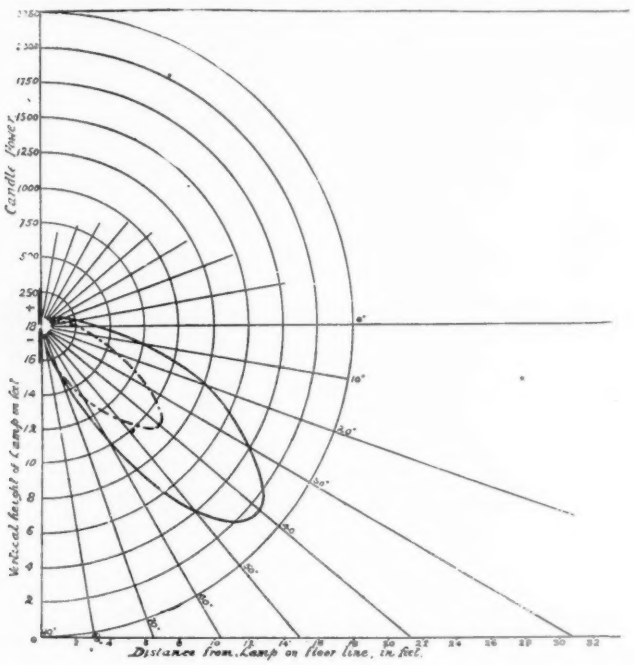


Fig. 4.—Diagram showing distribution of light from a continuous current arc: that for red rays by the dotted loop, that for green rays by the full line loop. The candle-power is indicated by the concentric curves. The vertical height of the arc and horizontal distances in the ground line are marked in feet. The radial lines of the looped curves show the illumination on the ground, it being in each case approximately equal to the candle-power of the loop at the point where the radial line cuts it.

The general result of these experiments was to show that if a given amount of power is to be expended in manufacturing arc light, it is more economical, as far as regards the total illumination, to expend this in the manufacture of continuous current arc lighting than of alternate current arc lighting.

Apart from scientific measurements, the general experience of people, where alternating arcs are used, is that, though the lamps "look" bright, the illumination on the ground level is disappointing.

For convenience of comparison, the curves from which the mean spherical candle-powers of the alternating and continuous current arcs, when supplied with 540 watts, were respectively obtained are here given —Figs. 4 and 5.

The diagram in Fig. 4 shows the candle-power given by a continuous current arc at any angle to the horizontal plane. The photometric measurements were made at a constant distance of a few feet from the arc. The measurements for green rays are plotted along the larger curved loop, and those for red along the smaller one. The maximum intensity of illumination is found at an angle of 40 degrees to the horizontal line through the arc. There are few direct rays for an angular space of 30 degrees round the base of the lamp, owing to the shadow thrown by the bottom carbon. The illumination above the horizontal line is so small as to be negligible.

The mean spherical illumination for red rays is, as shown in Fig. 1, 342 candle-power; that for green rays is 686 candle-power.

Fig. 5 is a diagram prepared in the same way for an alternate current arc supplied with the same power, viz., 540 true watts, and having the same size carbons, but with both the positive and negative cored. It is seen that the illumination is divided equally about the horizontal plane, and that the maximum intensity is only 775 candle-power. The greatest intensity occurs at about 48 degrees from the horizontal line, and the dark area under the carbon extends for an angular distance of 40 degrees from the base of the carbons. This is larger than in Fig. 4, because the crater is smaller.

As already stated, it is found that the continuous current arc is more efficient in the ratio of 3 : 2. But, if the quantity of light directly available for lighting a floor space be taken account of, then the efficiencies are in the ratio of 6 : 2.

The difference in practice, however, is not so marked, for a large part of the light from the bottom carbon may be reflected downwards by means of a reflecting surface suitably placed above the lamp. Yet, even if the whole of this part of the light be usefully employed, it is apparent that the first ratio cannot be decreased.

A reflector, moreover, must, to be efficient, be placed close to the arc, and, if the arc is not stationary, must travel with it, which introduces complications of mechanism better avoided.

It has been assumed to this point that the details of the two systems are the same, and that the difficulties are also the same, but this is not the case. The continuous arc with some forms of lamp will give very satisfactory results with ordinary hard carbons, and it is not absolutely necessary to have the positive cored, whereas the alternate current arc requires cored carbons, which are, of course, more expensive than solid ones.

Further, the alternate current arc is never quite silent, but there is a continual hiss or hum, which is more or less marked in, perhaps, all types of alternate current lamps. This effect, however, can be controlled to a large extent by using certain kinds of carbon and by a proper selection of the frequency.

A further disadvantage in the alternating system is the lag of the current behind the pressure, owing to which the current is always in excess of that required to produce the same mean illumination in a continuous current arc. For example, from an experiment to test this point, it was found that a certain continuous arc required 8.25 amperes and 45 volts to give a particular candle-power, and the alternate arc absorbed 15 amperes and 37 volts to produce the same, the apparent watts being in the ratio of 372 : 555. Thus, not only is there an increase of power for the alternate arc, but the larger current means larger waste of power in other parts of the circuits.

Against these disadvantages may be set off the great convenience of having only one set of circuits. This convenience has led to the use of alternate current for direct current arc lighting by means of rectifiers. The effect is a direct current with a regular rise and fall in intensity. This form of current may prove to be well adapted for serving many forms of arc lamps, because the waves give the necessary jerks or impulses to the feeding gear of the lamps and prevent the carbons sticking, as is sometimes the case with a perfectly steady current.

There is no doubt that the best advertisement (or worst, as the case may be) for the electric light is the street arc lighting. It is found that where good continuous current arc lamps are in use the electric light is very popular.

The writer has long been of opinion that, in all cases where a municipality or corporation supply electric light, good street arc lighting should always be part of the programme, because each ratepayer has an equal interest in and derives equal advantage from good street lighting, but he has not as great an interest in the private incandescent lighting unless he is a consumer.

In conclusion, whereas the above experiments and considerations seem decidedly to show the inferiority of the alternating arc lamp, yet there is room for further work in connection with the subject before the exact relative efficiency of the two arcs can be determined, and these questions it is proposed to discuss again before long.

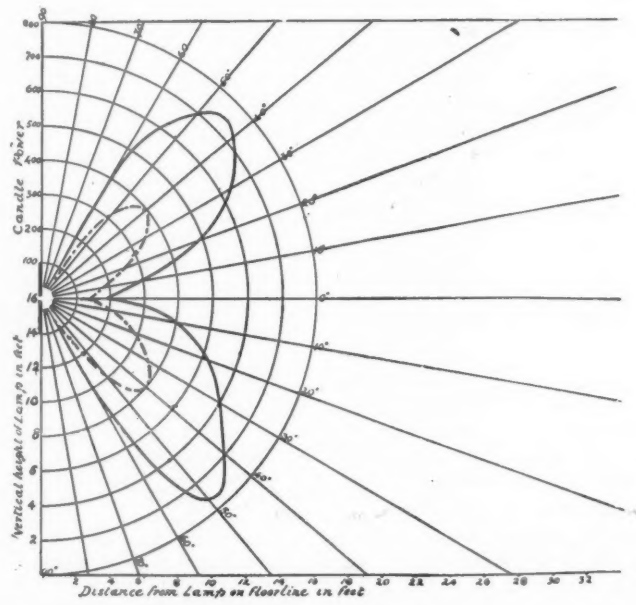


Fig. 5.—Diagram showing distribution of light from an alternate current arc; that for red rays by the dotted loop, that for green rays by the full line loop. The candle-power is indicated by the concentric curves. The vertical height of the arc and horizontal distances along the ground (or ceiling) line are marked in feet. The radial lines show the intensity of illumination on the ground (or ceiling), it being in each case approximately equal to the candle-power of the loop at the point where the radial line cuts it.

Society of Naval Architects.

Members of the American Institute of Electrical Engineers have been cordially invited to attend the second general meeting of the Society of Naval Architects and Marine Engineers to be held at 12 West Thirty-first Street, November 15 and 16. Among the papers to be read, of especial interest to electrical engineers, is one by S. Dana Greene on "Electricity on Shipboard — Its Present Position and Future Development."

TELEPHONE NEWS AND COMMENT.

The recent severe storm played havoc with the telephone lines all the way down the Atlantic coast from St. John, N. B., to Cape May, N. J.

Erie Telegraph and Telephone Company directors have declared dividend No. 44, $1 per share (quarterly), payable November 19. Books closed November 10 and re-open November 19.

Mr. Geo. D. Sherman, formerly with the New England Telegraph and Telephone Company, but for the past three years manager of the Northwestern Telephone Exchange Company, at Stillwater, Minn., has been promoted to a larger exchange for the same company at Sioux Falls, South Dakota.

The American Bell Telephone Company in calling its special stockholders' meeting for November 15 sends four enclosures: First, official notice of meeting; second, a copy of the act of the legislature which the shareholders are called upon to approve; third, stamped envelope addressed to the treasurer of the company; fourth, blank proxy with circular attached which courteously recognizes the right of stockholders to do what they please with their own. It reads: "A blank form of proxy is also enclosed, which, if you cannot present it in person, you are requested to sign and send to some one in your confidence for use, or to William R. Driver, 125 Milk street, Boston, if that be more convenient. A stamped envelope is enclosed for use, if you choose to send the proxy here."

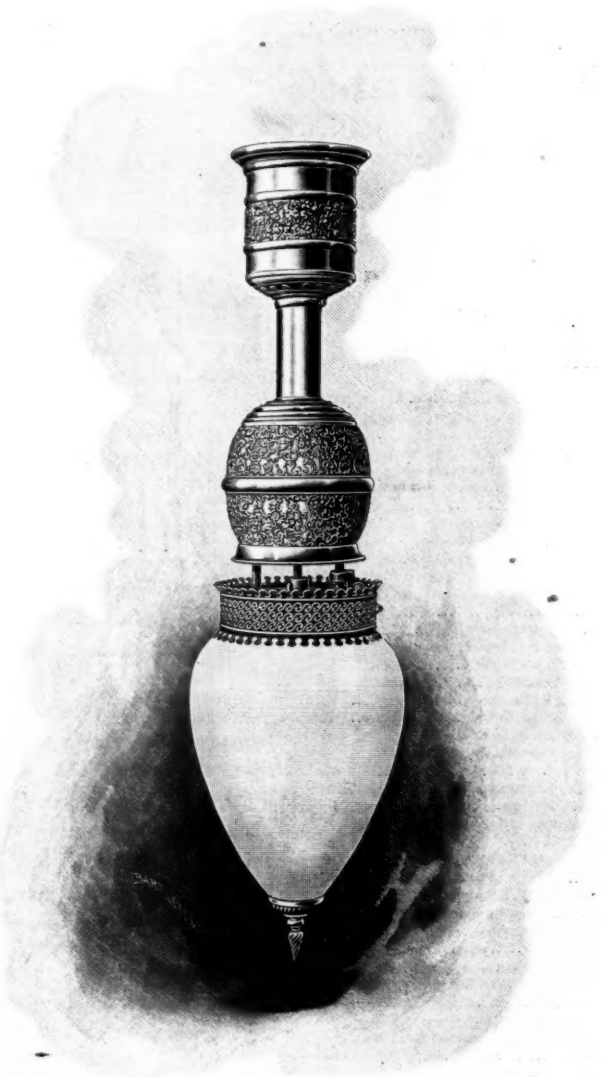
The damage to the long distance telephone wires caused by the severe storms last week has been confined to the district between Boston and West Boylston, where a trunk line goes through, a distance of 41 miles. Out of 2,100 poles 300 were down, and service was temporarily demoralized. These wires were the best in the State and were put up only a few years ago, but the formation of ice three inches deep on each wire proved too great a strain. One of the officials estimated that the weight of a single wire with this ice formation was about 250 pounds, or about five tons for the 41 wires in a section of 130 feet. The service west and southwest of Massachusetts is intact, the damage to wires being mainly confined to Massachusetts, Connecticut and Rhode Island. The loss to the company will be heavy, but it hopes by the end of this week to have the entire system again in first-class condition.

"A Great Deal of Interesting Matter."

The ELECTRICAL REVIEW, of New York city, contains a great deal of interesting matter, and seems to tell about everything there is of interest to electricians.—*The Detroit Sunday News-Tribune.*

Ornamental Arc Lamp for Incandescent Circuits.

The illustration on this page shows a standard ornamental arc lamp for incandescent circuits made by the Electric Construction and Supply Company, 18 Cortlandt street, New York city. The high quality of the arc lamps built by this company needs no emphasis. There are many thousands in use, and the number is increasing very rapidly. With enlarged facilities they are in a better position than ever to furnish a full line of arc lamps, plain and ornamental, for any service, outside and inside. They are also prepared to make special lamps according to customers' ideas and designs, and can deliver such lamps at very short notice.



ELECTRIC CONSTRUCTION AND SUPPLY COMPANY'S ORNAMENTAL ARC LAMP FOR INCANDESCENT CIRCUITS.

There are no main magnets in the Electric Supply and Construction Company's latest lamps, no dash-pots, no clock-work—almost nothing to get out of order. The mechanism of these lamps contains fewer parts than that of any other arc lamp ever made before, and their action electrically is all that can be desired.

The lamps are waterproof without the use of a hood. Being insulated they fully meet fire underwriters' requirements. They consume four, five, six, seven, eight, nine or ten amperes at proper voltages and burn from seven to 14 hours. They have universal carbon holders, providing a range of from five-sixteenths to five-eighths of an inch. The shortest lamp is 30 inches, the longest is only 48 inches. Even in the plain forms all lamps are ornamental, while those to which the word "ornamental" is especially applied are handsome and decorative examples of refined metal work. They adorn any room or space in which they may be hung.

Seriously Considered.

I thought that my editor had got hold of about the champion Ananias when he got that contribution a few weeks ago about catching game by electricity, but I see that the ELECTRICAL REVIEW, of New York, has got hold of a gentleman (possibly it is the same one) who is telling tales about one Meekin, a friend of one of Edison's assistants, which are much of the same stamp.—*London Electricity.*

Who Adopted This as a Telegraphic Signal?

It has been generally said that "O. K." was President Andrew Jackson's abbreviation for "all correct." Prof. W. S. Wyman, of the University of Alabama, however, thinks that President Jackson borrowed the phrase from the Choctaw language, in which the word "okeh" means "it is all right."

The Incandescent Lamp Situation.

With the general understanding among the trade that the Edison incandescent lamp patent will expire on November 17, renewed interest in the lamp situation is apparent. The Columbia case was expected to come up for argument and final decision before the Supreme Court on November 12. The Bate refrigerator case was to be heard on November 11, and a decision in this case would determine the time of expiration of the Edison lamp patent. If, however, the Supreme Court reaches a decision in the Sawyer-Man-Edison case in favor of the Westinghouse company, the result of the Bate case would be unimportant.

Mr. Rhotehamel, of the Columbia Incandescent Lamp Company, St. Louis, spent last week in New York perfecting final arrangements for the opening of a branch office. Mr. C. I. Hills will be in charge of this office, which will be located in the Havemeyer building.

It is rumored that at least three of the lamp companies which have been closed up expect to begin manufacturing again this week. These are the Perkins company, at Hartford, Conn.; the Sunbeam company, at Chicago; and the Orient company, at Youngstown, Ohio.

OBITUARY.

Francis J. Callanan, treasurer of the Union Traction Company, in attempting to board a train at Rutherford, N. J., on November 5, fell under the wheels and was killed. Mr. Callanan had been connected with street railways since boyhood. He had control of the Saratoga and Oswego street railways and was president of the People's Railroad Company, of Brooklyn. The Union Traction Company, of New Jersey, of which he was treasurer, was organized to operate a road between Newark and Hackensack. Mr. Callanan built the Syracuse railroad and the iron pier in that city.

Wires Downed By The Storm.

The storm which swept over New York city during the night of November 5, and became so severe in New England, greatly crippled for the time the service of the Western Union Telegraph Company. The greatest damage was done in Massachusetts, Rhode Island, and in some parts of Connecticut. Between Boston and Springfield, Hartford and New Haven, and north and south of Providence, poles and wires were overthrown and broken in large numbers, and for a time communication was entirely cut off.

What Car Fenders Are For.

"I notice they are putting fenders in front of the trolley cars," said young Mr. Fitts as he sat down to dinner.

"Oh, how kind!" twittered Mrs. Fitts. "They will be so nice for the poor motormen to warm their feet on when the weather gets cold, won't they?"—*Indianapolis Journal.*

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The gentle breezes blow and promise early snow; the proper time is now to buy that new snow plow.

The electrical editor wrote it "low tension" and the intell. comp. made it "slow tension." Not so bad.

The value of an invention lies in its ability to accomplish results quicker, better or more cheaply than they could be accomplished without the invention.

Now, let all pull together for better times. Everything indicates an improvement in business. The far-seeing industrialist girds up his loins and with determination proceeds to increase his product and sales.

The electrical fraternity are well pleased over the election of Col. W. L. Strong, former president of the Brush-Swan Electric Company of New England, to the mayorality of New York city. As the ELECTRICAL REVIEW remarked last month, we think he will make a model mayor.

That magnificent work, the *Century* Dictionary, has been supplemented by a valuable and fairly comprehensive pronouncing and etymological dictionary of names. All owners of the *Century* Dictionary should have this cyclopedia. We would like to know, however, by what system names are included and omitted; for instance, the name of the poet, James Whitcomb Riley, appears, but not that of Eugene Field, who is as good a poet and a superior man of letters. Of distinguished electricians, the names of Edison and Brush appear, but not those of Elihu Thomson or Tesla.

Electricity played an important part in the recent elections. Many stereopticons using electric lights were employed during the campaign for the usual purposes, and were afterwards used on election night to exhibit the returns. In New York city the *World* used the red and white incandescent lights on the dome of the Pulitzer building to indicate the result according to a prearranged code. The *Herald* used the big search-light on the tower of Madison Square Garden for a similar purpose, and also had a code of signals by which the blinking of the electric lights in the eyes of the owls on its building in Herald Square indicated how the returns were coming in. The telegraph and long distance telephone played their usual important parts, although the severe storm of Monday had crippled the connections between New York and New England.

PROFESSOR EBERT'S WORK.

Professor Ebert has made some interesting experiments in connection with the phosphorescent light emitted by certain substances when interposed in an oscillating electro-static field, and states that the light emitted is from 1,500 to 2,000 times more efficient than that of a standard candle. The effects may be produced in a simple manner by a small induction coil, but better by an electro-static influence machine; in addition to these a simple condenser formed by two plates of sheet metal is all that is required. A high rate of electro-static vibration is produced by a small spark gap across the condenser terminals. The experiments indicate that a system of lighting founded on this plan would be wonderfully efficient if some simple plan of distributing the rapidly vibrating currents could be attained. The enormous opposing influence of self-induction with conductors of even a few feet in length cuts a critical figure. Professor Ebert suggests that the rapid waves might be developed at the lamp by a slowly vibrating current led there by ordinary conductors; in this the REVIEW modestly calls attention to the fact that it made the same suggestion editorially more than three years ago (ELECTRICAL REVIEW, July 11, 1891, page 262).

The people of New York city have spoken for a rapid transit railroad, to be constructed by the municipality, by a vote of about three to one. This is the most convincing argument that could be offered to show the inability of the present elevated system to furnish proper service. Let the new road be equipped with electric power at the start. Any other motive power, if adopted, will surely be replaced by electricity.

Our esteemed weekly contemporary, the *Street Railway Gazette*, has good eyes. It published the address of Gov. Northen, of Georgia, welcoming the street railway delegates to Atlanta, and seeing the kindly allusion in it to the ELECTRICAL REVIEW, of course, included it in full. All of our other contemporaries failed to see this paragraph in the Governor's address, or we are sure they would have published it, too.

Now that the elections are over there seems to be nothing to hinder the advance of that long-delayed business boom. All the country needs is a little time to catch its breath, cure the sore throat caused by cheering, take a little bromo-caffeine for its head, and then the march of progress and prosperity will be resumed.

NEW YORK CITY VOTES FOR RAPID TRANSIT.

COMMISSIONERS NOW HAVE AUTHORITY TO CONSTRUCT THE ROAD AT PUBLIC EXPENSE.

At last the great work of providing New York city with a system of rapid transit which shall in every sense be adequate to the needs of the metropolis is fairly under way. The people have demanded it, and the Rapid Transit Commissioners, at a meeting held last week, showed that they have every determination to proceed, without a day's unnecessary delay, to the actual work of construction.

The vote for the construction of the road at the public expense was overwhelming, being in a ratio of over three to one. The residents of the northern section of the city, who will be most benefited by rapid transit, cast an especially heavy vote.

Under the law the method of procedure of the Rapid Transit Commissioners is as follows: They must file with the county clerk an official statement of the vote for and against municipal construction. If there be a majority vote for municipal construction, it is the duty of the commissioners to begin the construction of the road and to make and let contracts for the work within 30 days after filing the official vote. The only way the commissioners can gain time is by delaying the filing of the official vote. The work of securing consents of property owners and laying out feasible routes will, doubtless, make this delay necessary.

While under the amended rapid transit act the Commission is called upon to consider only the plans of its predecessor, and is not bound to adopt any particular route or system, it is now pretty well assured that the west side line will conform in its main features to the underground route laid out by the old commission. This follows the line of Broadway to Fifty-ninth street and thence up the Boulevard, Eleventh avenue and the Kingsbridge road to the northern boundary of the city. In addition to this, the engineers have laid out an east side line, the details of which have not yet been published. It will thus be seen that a vast amount of preliminary work has already been accomplished.

At a meeting of the commission held last Friday the following resolution was adopted:

"*Resolved*, That public hearings be given on Tuesday and Wednesday, November 13 and 14, from 1.30 to 4.30 P. M., at which persons will be heard who desire to suggest changes in the routes already provisionally adopted by the board and to make suggestions as to the extension of the east side routes above the Grand Central Depot."

The Rapid Transit Commission consists of the following gentlemen:

President Alexander E. Orr, Mayor Gilroy, Seth Low, Comptroller A. P. Fitch, John H. Starin, Judge Henry R. Beekman, William Steinway, John Claflin and John H. Inman. Mr. Delafield is secretary of the commission, Mr. Parsons is chief engineer and Messrs. Beekman and Boardman are counsel.

Wall Street and the Electrical Stock Market.

The boom in the stock and bond market which has followed the election indicates unmistakably that financiers regard the returns overthrowing the Populist and Democratic parties as decidedly favorable to the future prosperity of the country. The result is expected to give business a sharp stimulus, and the fact that it is expected has already made business better. Or in other words, it will restore confidence which has been so badly needed for over a year and a half. The professional bear element which has dominated the stock market has been completely put to rout, and the advance in prices, which at first was the result of covering of short contracts was later augmented by heavy buying by bull cliques, and capitalists who sold out their stocks some time ago and are now taking them back. The future of the market depends very largely upon the ability of the inside clique to make stocks sufficiently attractive to draw in the public. Wall street feels decidedly encouraged over the outlook, and if there is any truth in the oft-repeated assertion that this world of finance discounts events by two or three months, a decidedly better tone to general business may be looked for early in the new year.

General Electric participated in the general advancing market, and in some respects was the leader. The lowest point was recorded on Monday, it being 35½. The highest was 37¾, touched to-day. There has been a heavy short interest in the stock, and the covering has been largely responsible for the advance. A. J. Weil & Company did more than any one interested to depress the price of a few weeks back. It is now stated on what is considered good authority that that house has turned bull upon the market. I am told that interests who were heavy buyers of the stock on the decline below 35 propose to hold on until they can realize a handsome profit. It is established beyond peradventure that the affairs of the company, from a business standpoint, are in excellent condition. The Chicago street railway contract is giving the company all that it can do with its present force, and has already necessitated enlargement. Indications point to a large increase in this order. Aside from the business which it derives, the industry will profit by the innovation which it brings about in the operation of metropolitan street railway systems.

The booking of this contract created a much more hopeful feeling among the management of the companies. It indicates that they had not only not lost a market for their goods, but can compete on at least equal terms with all others. General Electric has all the working capital needed, ample facilities for turning out work, and under its new operating policy its costs have been reduced to the minimum. The preferred stock on which there is accumulated dividends, which in January will amount to 10½ per cent, is selling at a very low figure, namely, 65 against 37½ for the common stock. Ex the dividends, the stock at ruling price is worth 54½. I look for an advance in this security in the coming week if the boom in the market continues. Small lots of debenture bonds sold at 89½ to 91½, the last sales being at the highest figure.

The other electrical stocks traded in were Western Union, which advanced 2½ points to 90; North American, which was steady around 4½ and American Telegraph and Cable, which sold at 91.

Of the inactive electrical stocks, Postal Telegraph was bid 50 and offered at 55. There was no inquiry for Commercial Cable. The lowest price at which this stock has sold in the year was 140 in March, the highest 150 in July.

A meeting of the directors of the American District Telegraph Company was called for last Thursday to take action upon the dividend. Owing to a lack of a quorum the meeting was postponed. The quarterly dividend due in August was not paid. The last paid was in May of this year, amounting to one per cent. It is thought that a similar amount will be declared December 1. The stock was not traded in during the week.

On the Boston Exchange, Bell Telephone was only nominally traded in between 194 and 194½. Erie Telephone was steady at 53. General Electric preferred was unchanged at 65. New England Telephone lost 1 point, selling at 66. Fort Wayne Electric was bid 2 and held at 2½. There was no change in Westinghouse quotations, the common stock being bid 35⅜ and held at 36, and the preferred bid 52½ and offered at 53.

BAIN.

New York, November 10.

FORT WAYNE GLAD.

R. T. MACDONALD BUYS THE FORT WAYNE COMPANY'S PLANT.

The Fort Wayne, Ind., *Journal*, in a recent issue, says:

The Fort Wayne Electric Works will remain with us. Mr. R. T. McDonald has purchased the plant outright and Judge R. S. Taylor has gone East to prepare papers for the transfer.

The litigation instituted some months ago will end, and the great corporation will take its place as one of the permanent industries of the city.

The credit for this belongs to Mr. R. T. McDonald, and no other man in the United States could have brought the powerful General Electric Company to terms.

Few greater victories have ever been won in the commercial world and it will be glad news to the people of Fort Wayne.

Mr. McDonald is practically at the head of the electrical business of the country, and greater and better things are in store for the city he has battled for when clouds hung heavily over his head.

TOOK FOUR THOUSAND FIVE HUNDRED VOLTS AND STILL LIVES.

MR. CUTLER, OF THE STANLEY ELECTRIC MANUFACTURING COMPANY, HAS A NARROW ESCAPE — RESUSCITATED BY D'ARSONVAL'S METHOD — TREATED AS A DROWNED PERSON.

M. D'Arsonval, of Paris, when he reads this issue of the ELECTRICAL REVIEW, can congratulate himself that his researches on the effects of electric shocks on human beings have resulted in the saving of another life. Owing to the methods of resuscitation proposed by D'Arsonval and their prompt application by the officers of the Stanley Electric Manufacturing Company, of Pittsfield, Mass., Mr. J. E. Cutler is alive to-day.

On October 23 the ELECTRICAL REVIEW received the following press dispatch, which was sent out from Pittsfield, Mass.:

J. E. Cutler, superintendent of the testing department of the Stanley Electric Manufacturing Company, accidently took hold of a wire carrying 4,000 volts this morning and suffered a terrible shock. Prompt attendance restored him to consciousness, and hopes are entertained of his recovery.

An inquiry for the verification of the dispatch and a request for further particulars was at once sent to Mr. Henry Hine, general manager of the Stanley company. The following is Mr. Hine's reply:

TO THE EDITOR OF ELECTRICAL REVIEW:

We are in receipt of your favor enclosing the enclosed clipping. In regard to this matter we would say that on October 22 our Mr. J. E. Cutler received a shock from a wire carrying 4,500 volts. This pressure is used in our testing department for experimental purposes, and through an accident Mr. Cutler took hold of the two terminals carrying this pressure. He was immediately completely prostrated and to all intents and purposes was dead, but was revived by the method advocated recently in electrical and other journals by D'Arsonval, of Paris, that is, he was treated exactly as a drowning man would be, and a few minutes of this treatment finally brought him to. He was, of course, prostrated for a time by this accident, but the next day was again attending to his duties as far as his hands would allow him. His hands were quite severely burned by this shock and it will probably be some time before he obtains complete use of them. There is no doubt in our minds but that Mr. Cutler would not have survived this accident had he not been promptly attended to, and this experience should be of value to those who are liable to come in contact with wires carrying high pressures.

Yours truly,

HENRY HINE,

Stanley Electric Manufacturing Company.

November 2, 1894.

Mr. E. M. Barton, president of the Western Electric Company, was one of the distinguished Chicago visitors to the Greater New York last week. This great electrical house, particularly the New York branch under the efficient management of Mr. H. B. Thayer, is entering the electric railway field, and its handsome and comprehensive catalogue is attracting the attention of all the street railway owners.

Marriage portions after 20 years' service is what the female telegraph operators in England now ask of the Postmaster-General. They will all be 40 or over then.

Liability of Street Railway Companies for Accidents.

The following interesting discussion occurred at the close of the first day's proceedings during the recent convention of the American Street Railway Association at Atlanta, Ga.:

Mr. Payne: Bearing upon the question of the gentleman in regard to the propriety of paying expenses of taking care of people, we had an experience in our company in that direction where the evidence seemed to point to the conclusion that the company was not liable. Our attorneys so advised us, and friends of the injured party admitted that there was no liability, and upon their admissions and representations we sent the injured person to the hospital and cared for him for several months. I think we spent nearly a thousand dollars in the case. When we went to get a release and offered to throw in as a gratuity a few hundred dollars they refused to settle with us. We litigated because we were assured we had a perfect defense. Judgment was rendered against us for $7,800, and the fact that we had done something to alleviate the distress of the injured person was used against us on the trial, upon the ground that we must have believed that we were guilty of negligence or we would not have expended so much money. That seems pretty hard—to help poor people out when they get injured and then have a jury render a verdict entirely against the weight of the evidence.

Mr. Shaw: If we are liable the insurance company which insures us is liable.

Mr. Payne: The trouble about insurance companies is that they do not insure more than half the accidents. We think it a wise policy to settle our cases.

Mr. Connette, of Nashville: After the accident has occurred we investigate it immediately. If we find upon investigation that the company is liable, we then go ahead and take care of the parties the very best we can. If we find that the company is not liable, we then cease all expense in the case. Frequently where we have the most trouble is with lawyers. They will hunt up a case and institute suit immediately, without making any effort toward a compromise. The only method I have found satisfactory in an instance of that kind is to endeavor to settle the case outside of a lawyer, which I have done in a number of instances and cut him out of his fee. Where we cannot settle the case, I have found about the best way is to keep the matter in court as long as we can, because as long as it remains in court the more easy it is to effect a compromise. After a case has been in court two or three years it is easier to effect a compromise than it is at the time of the accident. I find another thing of importance, that is to pursue these cases after they get into court. We should endeavor to use our influence to get such men on a jury as will give a corporation justice. I believe it is just as essential to keep up the political end of street railway management as it is in any other part; and if you will endeavor to stand in with the powers that be and with those who have influence and with the authorities who have the appointment of these jurors it is likely that you will secure better results. That has been our experience, and very few judgments have been rendered against us, the largest being $1,500.

Mr. Cole, of Elmira: It has been our experience that the sympathy of the average juror is usually with the plaintiff, and that the testimony of the witnesses is also apt to be warped in their favor; and I have been able to obtain favorable evidence from the witness by promising the motorman that if he can obtain such evidence as will exonerate him from blame he will be reinstated in his position. He will go to this witness and get a written statement of his views of the accident, and in a great many instances, where he represents that he is liable to lose his position, he will get fair and favorable evidence; and then the witness will keep to this before the jury when the trial comes off.

Mr. Minary, of Louisville: I understand you suspend the motorman?

Mr. Cole: Yes, until he gets such evidence from the witness as will exonerate him from any blame, and we have been able to get good evidence in that way. If he cannot obtain the evidence, we will let him go on, but I think it is well to suspend him for a time.

Mr. Minary: As soon as you let him go, you acknowledge your responsibility for the accident.

Mr. Cole: We do not let him go until after the matter is disposed of.

Mr. Semmes, of Memphis: Is the evidence which the motorman gets reduced to writing?

Mr. Cole: Yes, we do this as far as possible.

Mr. Semmes: As I understand you, you simply suspend him during the investigation, and if you find he does not bring this testimony, then you discharge him?

Mr. Cole: Not at that time; that would be hard against us in court; he is not discharged entirely from the company until the case is disposed of.

Mr. Semmes: What would you do in a case of that kind—put him on the "extra list" and pay him for his time?

Mr. Cole: No sir, we give him some other work—in the shops.

Mr. Payne: I take it in case you settle at the time, then you do not hold the motorman responsible?

Mr. Cole: We do not.

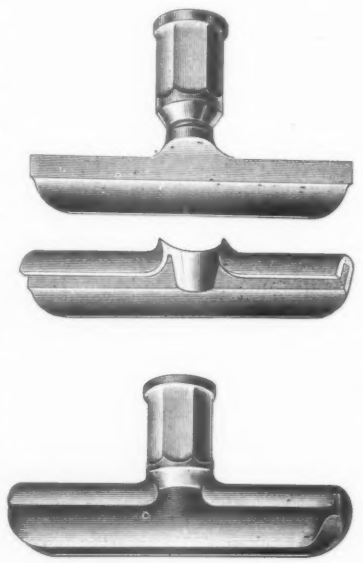
LITERARY.

"The Life and Inventions of Thomas Alva Edison," by W. K. L. Dickson and Antonia Dickson. One Vol. 4to xvi+362 pp.; 158 illustrations from drawings and photographs; cloth, gilt top, $4.50. T. Y. Crowell & Company, New York. Supplied by the ELECTRICAL REVIEW Publishing Company, 13 Park Row, N. Y.

In spite of his prominence there has hitherto existed no full and satisfactory biography of Mr. Edison. The incomplete sketches extant have been also disfigured by many mythical and erroneous statements, particularly in regard to his early life. The authors of the present volume have been for some years attached to the Edison works at Orange, New Jersey, and they have thus come to know the inventor very intimately. He has given them the benefit of his aid in describing the evolution of his most remarkable inventions and has to a certain extent superintended the biographical portions of the work. It may be taken, therefore, as the standard and only authentic "Life" of him. It is brought down to the immediate present, even including a description of the Kinetograph. The book is written with enthusiastic admiration, is filled with entertaining anecdotes and vivid descriptions and gives a most delightful impression of the personality of the man. It is beautifully printed, sumptuously illustrated, and makes one of the most valuable gift-books of the season.

A New Trolley Wire Clamp.

The Central Electric Company, of Chicago, have developed a new trolley wire clamp, which they are now offering to the trade. The construction of the clamp gives it a very neat and compact appearance; at the same time in no way does it detract from the necessary strength. No strain that is brought to bear upon the trolley wire is sufficient to cause this clamp to release its hold. As seen from the illustration the two parts are locked together in a manner that makes it simply impossible for it to become displaced after being hung.



A NEW TROLLEY WIRE CLAMP.

Of course, no soldering is necessary. The clamps are made to fit either a five-eighth or seven-sixteenth inch stud and are furnished in bronze or malleable iron. No obstruction is offered to the passage of the trolley, it having a perfectly level track to run on, and consequently there is no destructive or wasteful sparking.

Another specialty that the Central Electric Company is exploiting in the West is the Samson batteries. These standard goods are like old wines in that they need no bush; no illustration is necessary; every bell fitter in the country knows the Samson and knows that it is well named. They are clean cut, neat in appearance and do an astonishing amount of hard continuous work.

The Residual Charges of Condensers and Their Dependence Upon Temperature.

Under this title Messrs. Frederick Bedell and Carl Kinsley have written a lengthy paper for the *Physical Review*. They state that when a condenser is subjected to a difference of potential for some time, part of the charge received is absorbed by the dielectric and a part remains upon the surface of the condenser plates. The part absorbed depends directly upon the duration of the time of charge; the part remaining on the surface is practically independent of the length of charge for the condensers used in the present investigation. This was shown in a preliminary investigation by Messrs. W. M. Craft and H. B. Henderson, who showed the first discharge, as measured by the throw of a ballistic galvanometer, to be independent of the length of charge. This latter part becomes discharged when the terminals of the condenser are connected together through a conducting circuit and the condenser appears to be in a perfectly neutral condition. The absorbed charge, however, still remains in the condenser and will gradually come to the surface in the form of a residual charge of the same sign as before. If this be discharged, and the condenser be allowed to stand insulated, a second residual charge will collect in the same way as the first. A series of residual charges with rapidly diminishing values may thus be formed. Therefore, the condition of a condenser is dependent upon its past charges, some of which may have been held by the dielectric for weeks or even months before appearing upon the surface; a former charge of one sign may entirely neutralize a subsequent charge of opposite sign and smaller value. It has been justly said that the past history of a condenser must be known before it can be trusted. The object of the present investigation was to determine this soaking-in effect of dielectrics.

The authors conclude that the action of a condenser is dependent, in a marked degree, upon its previous history; so much so, in fact, that its previous charges may be of more importance in determining its action under certain circumstances than charges received later. In that case the previous absorption, after neutralizing the absorption due to the final charge, may give rise to residual discharges, which increase with time up to their previous initial value.

Absorption gives rise to the phenomena of residual charges and causes the condenser to depart from the exponential law in discharging through its own dielectric. The increase in apparent resistance in the condenser during discharge is associated with this effect of absorption. Previous charges modify these results, increasing or decreasing them according to whether the previous charges were in the same or opposite sense.

The resistance of pure oils is constant at any one temperature, but falls off rapidly with the temperature. There are, accordingly, no absorption or residual effects in pure oils.

In solid dielectrics the effects of absorption are diminished as the temperature is increased, as shown by the residual discharges and by the changes in the insulation resistance.

The fact that the previous condition of the condenser has such an influence upon its action causes considerable embarrassment in an investigation of this sort, inasmuch as a condenser used once under certain conditions may be practically useless in the same investigation for further experiments. One of the condensers experimented upon retained its past charges after being short-circuited for a month, and it was necessary to employ another condenser, which was neutral for further experiments.

THE INTERDEPENDENCE OF THE ARCHITECT AND THE ELECTRICAL ENGINEER.

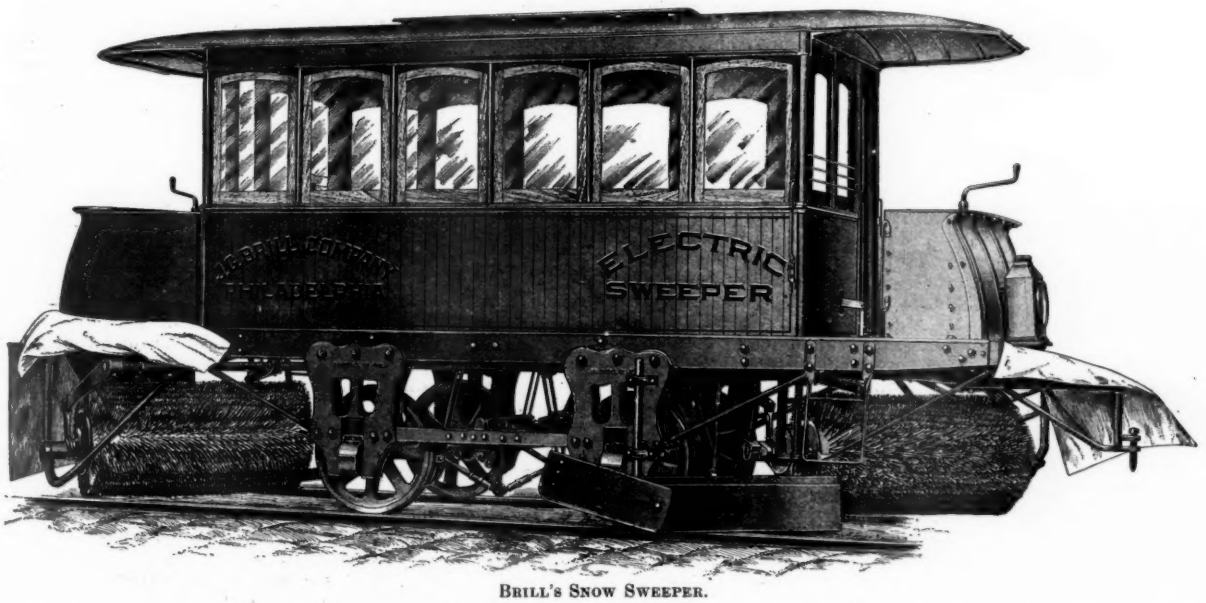
BY FREDERIC A. C. PERRINE, D.SC., IN "ELECTRICAL ENGINEERING."

In common with all new professions electrical engineering has been compelled to define its boundaries. The electrical engineer was at first one whose training had been that of a mechanical engineer, or perhaps that of a civil engineer, but whose opportunities or tastes had led him further into contact with the application of the growing science of electricity, until finally that which was the minor part of his training became the major part of his work. As soon as the engineer acknowledged himself upon this new ground and accepted the science of electricity as his main foundation, he was led into a wider field searching for new applications of electrical power. In order to install to the best advantage the electrical machinery which has superseded some crude method of solving a mechanical problem, the electrical engineer has found himself compelled to become familiar with the mechanical problem itself. Those educated in the application of other methods have been unwilling or unable to entirely reorganize their knowledge and rearrange their thoughts in accordance with the new methods, and therefore the electrical engineer has stepped in to supply the connecting link between the new and the old professions.

This history of the development of the electrical engineering profession has been particularly exemplified in the introduction of electric lighting and power into large buildings. The reluctance of the architects to undertake the study of the details of an electric lighting system has been largely responsible for the slow progress of the introduction of electricity into the household. The fire underwriters have been made cautious by the many haphazard attempts of the general introduction of electricity for all uses, though such attempts were mainly defective on account of the lack of understanding between the architect and the electrical engineer. The designer of a modern dwelling, as well as the designer of a tall office building or vast apartment house, is compelled to make careful study of the most recent methods of lighting, elevator construction and heating, for in our houses we demand all the comforts of the finest club or hotel, whereas the designer of an apartment house or office building requires not only tact in selection of appliances most conducive to the comfort of the inmates, but he must also look carefully to economy in furnishing these same comforts. Beginning with the construction of the very walls of the building itself, economy dictates that there should be the least possible fire risk in the building, and that throughout the construction all precautions tending to lower the insurance rate should be carefully taken. The problem of lighting such buildings as the Equitable Building in New York, the Rookery in Chicago, or the Mills Building in San Francisco, are not inferior in importance or difficulty to the problem of furnishing light for a town of six or eight thousand inhabitants. The architect who designs such a building must, therefore, make himself familiar with the design, construction and maintenance of a very considerable central station for the lighting of the building. He is called upon to decide between the respective merits of electrical and hydraulic elevators, and it seems probable that within the next few years it will be necessary for him to arrange for the installation of a telephone system as well as an electric heating plant. The knowledge which would be required in the intelligent choice of the apparatus to be installed in so varied an electric plant is surely that of an electrical engineer. Shall we say that either our architects must become one of the electrical profession, or that it will be necessary for the electricians to study architecture? Both of these propositions seem to ask for more ability and diversity of training than should be expected of one man in either profession. The architect is unlikely ever to gain the experience in the handling of electrical machinery which should always be the guide of the electrical engineer in selecting apparatus. The electrical engineer has devoted himself to the evolution of mechanical problems, and he cannot be expected to have acquired the artistic talent and knowledge of building construction which would make him a capable architect. While these considerations would lead us to expect a total separation of the two professions in the individual, they yet point the necessity of a mutual understanding between the two when working together on the same design. It should not be necessary for the electrician to search in vain on the plan for space in which to run his wires. The architect should understand the reasonableness of fuse wires and junction boxes, and he should be capable of understanding that there is a limit to the inaccessibility of the location in which a dynamo can be erected and properly cared for. At the same time that the architect's knowledge of electricity would aid in the installation of the apparatus, he would also be more easily acquainted with whatever new developments might come in the application of electricity to his needs, and though he might be expected to turn to an electrical engineer for the selection and installation of his plant, yet he should present plans to the electrical engineer in which the demands are possible, and in accordance with the most recent practice. This is the newest and most definite advance that electrical engineering has made toward becoming a profession. The electrician who was an inferior jack-of-all-trades to which electricity might be applied, and whose title was derived from a six months' experience in a machine shop where electrical machinery was being manufactured, has long since lost his repute. With the advent of the trained electrical engineer the members of the profession have reached the dignity where they may reasonably expect to be called into consultation with the members of other professions on an equality, and where the interdependence does not mean amalgamation, but intelligent joint authorship.

Brill's Snow Sweeper.

The illustration herewith shows a very complete snow sweeper manufactured by the J. G. Brill Company, Philadelphia. This sweeper is designed for operation by electric motors, three being used, two for propulsion of the vehicle and one for driving the brooms. The application of the motors for propulsion of the sweeper is the same as in the Brill snow plough, and the motor driving the brooms is set inside the cab, diagonally of the car and imparting its motion by sprocket wheels and chains. The brooms can be raised or lowered at will by a system of powerful levers. The sweeper works equally well in either direction, and the Brill company is now constructing several sweepers for different parts of the country. For city use on paved streets the merits of a sweeper, as compared to a plough, are in favor of the sweeper, but it is advisable for a city road operating over paved streets to have both plough and sweeper. A sweeper to be operated successfully should be started in operation at the same time a snow storm starts and kept in continual operation until the storm ceases. But as it is an expensive matter for a company to keep a line in operation all night, for the purpose of running a sweeper alone, it is, therefore, advisable to have for operation in conjunction with a sweeper one of Brill's ploughs, which is capable of operating in deep snow. For suburban use over unpaved streets, a sweeper will pick up and throw with great force stones of considerable size, which is dangerous; for this reason a plough alone is recommended for suburban use.



BRILL'S SNOW SWEEPER.

The annual meeting of the West End Street Railway stockholders will be held in Boston on November 27 to choose directors and transact other business. Transfer books will be closed from close of business, Tuesday, November 13, until Wednesday, November 28, 1894.

It is said that the Philadelphia Traction Company will discharge any of its employés taking part in labor organization.

IS THERE A SOLUTION OF THE ELECTRIC CONDUIT RAILWAY PROBLEM?

ABSTRACT OF A LECTURE DELIVERED BEFORE THE NEW YORK ELECTRICAL SOCIETY, NOVEMBER 1, 1894, BY JOSEPH SACHS.

Hundreds of conduits have been tried. Perhaps no other branch of electrical engineering can boast of the vast variety of systems and plans that have been developed by various promoters as the class of conduit electric railways; in fact, of all the electric railway patents in the Patent Office to-day, over one-half are conduit railway systems; that includes locomotives, storage batteries and everything else that appertains to electric railways.

Why is it that success has not been obtained? Perhaps on account of some inherent difficulties, which I, however, doubt, and which a great many others doubt, and another is, perhaps, the extreme large cost of construction and maintenance, although the maintenance would seem to be less than the trolley.

From the fact that there are in existence to-day two electric conduit systems—in operation to-day—it would appear that we could build other systems of similar character and somewhat similar construction and have them work successfully; but up to date nothing that has been successful on a commercial basis has been forthcoming.

I have taken up the various systems that have been devised and divided them into six classes, and have selected some this evening, of the more important, which I shall describe to you. We shall first take up the various open slot continuous wire conduits.

The first will be the well-known Bentley-Knight system, which was one of the first attempts ever made in this country to solve the rapid transit problem by means of electricity. It consists of a very small open-slotted conduit with two wires suspended therein. The conduit was exceedingly small and, although this road was operated for some time, it was at last abandoned.

The Bentley-Knight people, however, were not satisfied with that attempt and got out another system. It also had a very small conduit, but instead of placing it in the middle of the track it was located at the side of the rail. Two wires were located therein, and the plough coming down from the car came in contact with the wires, one on each side. A system of this kind was installed as early as 1885, and although the apparent conditions would be exceedingly against its successful operation, strange to say it is operating to-day and paying dividends. I refer to the Blackpool system, which is operated in Blackpool, England, to-day.

The system which I now show you is the far-famed Siemens-Halske system, which is being operated to-day at Buda-Pesth. The conduit is a peculiar one. It is located directly beneath the rail. The car wheel is very dissimilar from that used in this country. It is a centrally flange one, so to say, the flange running between the two rails, the object being to keep the slots open at all times. Two wires are used, one each side of the slot, and the whole space around the conduit is filled up and protected by cement. This conduit has been in daily operation since 1889; dividends are paid by the road, and 60 cars are operating on six miles of double track. But I doubt very much whether a conduit of that size would operate on this side.

Here we have the latest addition to open-slot conduits, which is proving more or less successful, the "Love conduit." We have here a large conduit and the wire placed high and dry; and, furthermore, about the most important thing of the system is that the wire is accessible by placing above the wire a detachable slot rail or cover, which can be raised at any time and the wire inspected. But apparently it did not prove satisfactory, and when the same system was introduced in Washington they adopted another form of construction. The heavy yoke was replaced by a simple trough located between the tracks. This conduit, I understand, is to-day in operation in Washington, whether fully successful or not I do not know.

Most of these forms of open slot conduit which I have shown you possess several points of disadvantage. First they have the disadvantage that the conduit is extremely small; the wires are unprotected and poorly located; they are placed low instead of high; the insulators are poor and inaccessible; and the problem seems to have been attacked from the wrong standpoint, namely, to get a cheap system to compete with the trolley.

We will take up the movable lip or cover conduit. In this form the aim has been to protect the wire, and in order to do that several inventors have attempted to cover up the slot to keep the slush, mud and dirt out, except when the trolley is passing. One of the best known of these is the Van Depoele conduit. Mr. Van Depoele devised two forms, both of which have flexible lips, which cover the slot of the conduit containing the wire. The conduit is very small, and there are two lips which press together over the slot and which are pushed aside by the plough of the car as it comes along, but closes again after the car has passed. In another form Mr. Van Depoele devised he put the same construction inside of a somewhat larger conduit.

The difficulty with these open slot movable cover conduits is practically the same as the previous class and possesses the additional disadvantage that we have no flexible material that will stand the strain of every-day railway traffic, and the shutters when made of metal cause a great deal of noise and do not seem to afford a great deal of protection against injury to the wire.

The "surface contact systems" hold forth certain attractions in the way of cheap first cost and dispensing with the open slot. The Lineff system has been tried experimentally. It consists of a sectional iron contact rail which is flush with the street surface. It is made in sections of six to ten feet placed on top of the conduit, which is entirely closed and is composed of some insulating material in which is laid a strip of copper, attached to the bottom of which is a strip of iron and this composite strip is connected with the source of supply. Upon the car is a magnet, having a wheel at each end and placed longitudinally with the track. When the magnet is energized the composite strip is attracted up to the rail and connects that section of the rail with the dynamo; and so, as the car moves along, the magnet pulls up the strips in succession and connects each successive section of the contact rail with the source of supply, and thus supplies the motor on the car.

Another surface contact system devised by Mr. Van Depoele is practically the same in principle. The contact conductor consists of a number of sections on the surface of the street; the contact device or collecting plow consists of a magnet, the poles of which are brushes. The switching device is a small car which runs upon rails in the conduit and directly beneath the sectional contacts. The lower rails form the supply conductor and the car acts as a connection between it and the section above. As the motor car runs along, the magnet beneath pulls the little car through the conduit and connects each successive section with the source of supply.

In the system devised by Messrs. McElroy, Nicholson and McTighe, instead of using a sectional rail contact, plates are used which are located between the track on boxes in which the switch mechanism is located. The poles of the magnet are very long and project from the plate on one box to the next. In the box a small lever is pivoted and connected to the supply wire. When the magnet on the car is over the box the lever is attracted up against the contact plate and connects it with the supply wire, and the current is taken off by the long bar which forms the pole of the magnet. The long bar is long enough to span two contact plates.

Now, here we have a system, which I have had a little experience with and which has made me a little doubtful respecting the ultimate success of the surface contact system. It uses very much the same methods as the McElroy, Nicholson and McTighe system. Contact plates are used, but the electro-magnets are not placed under the plates, but in accessible manholes or placed upon posts along the road, a number of them controlling a section being grouped together. The brush under the car is always in contact with two or more heads. One head is energized, and when that has been energized the last one is dropped. The conduit consists merely of a small trough, in which the wires were run to the various switching magnets, which were all located together. The system was originally an invention of Mr. G. T. Woods.

In the Siemens system contact plates are used and the switching mechanism consists of a pivoted lever, which is first attracted by the magnet on the car, and after the plate has been connected the current passes around a coil of wire on the lever and magnetizes it as long as the car is taken from the plate. In the Johnson-Lundell system, a sectional rail is used instead of contact plates.

The peculiarities of this system are that the car is also equipped with a storage battery, so that in case the brush under the car loses contact with any section of the contact rail, the car is operated by the storage battery. The battery is also used to actuate the magetic switch if it should be de-energized.

Various other surface contact systems have also been devised by Gordon, Pollack & Binswanger, Schuckert and others. In the last named system iron filings are used as the switching medium in the same way as the levers are used in one of the systems described.

Now, as you see, from the vast variety of possibilities and probabilities that I have shown, the solution of the conduit electric railway problem is not at all limited, and all you have got to do is to pay your money and take your choice; but the peculiar part of it all is that there is not much choice to make, because apparently nothing has ever been evolved—nothing commercially practical—from any of the vast variety of material, except the plain, every-day open conduit and the continuous wire. That simply means that it has many points of superiority, because it is actually in operation and nothing else has ever operated. We have such a system in operation at Buda-Pesth and at Blackpool, England, but it is doubtful whether either of these systems can be made operative in this country. The climatic conditions are different, and it is doubtful whether our American streets are quite up to some, at least to those streets in Buda-Pesth, in which one of the systems is in operation.

But let us return to the open slot conduit systems that have been tried and installed. We find, in the first place, a very small conduit poorly constructed; the wires are located in very poor positions and badly protected; the drainage is exceedingly poor and the voltage is exceedingly high. The last is the case in the attempts that have been made and that have failed, although in the attempts that have been made and succeeded, the voltage is low — being about 300 volts. The aim has always been to produce a cheap system—a system which will compete with the trolley. That is a very desirable aim, but not one that is absolutely necessary, and from the fact that cable traction companies will put in cable systems where the track construction costs alone very nearly $100,000 per mile, single track, as in this city, I think we can afford to spend quite a little on a conduit system which will operate as well as the cable system, and certainly has various advantages which the cable has not. The problem is, primarily, one of mechanical construction of the conduit. We must get a large conduit; a dry conduit; we must place the wires in such positions as to make them high and dry and various other conditions must be studied. I believe that these points can be met and that a system containing them can very readily be devised; in fact, Mr. C. H. Warner, an electrical engineer of this city, and myself, some time ago attempted to attack that problem. We devised a form of conduit which has various points of advantage; we took the ordinary Broadway circuit in this city, and we got up an insulator which is a very peculiar affair. It consisted of a central core of insulating materials, in which was imbedded a stud or bolt. On the core of insulating material were placed a number of petticoats of enameled metal and separated from one another. A number of these were placed on the core and clamped by the oil cup at the bottom through which the bolt passed, and the whole was fastened together by a nut on the bolt coming against the bottom of the cup, the clip being attached to the end of the bolt. The insulator was supported by arms attached to the top petticoat which came against an enlarged portion of the insulating core. By this arrangement a very long surface was presented for surface leakage, namely, the inside and outside of each of the petticoats and the oil in the cups. The insulators were supposed to be in the regular manholes and were located at 30 feet apart and the wire was supposed to be sustained; the contact was supposed to be an underbearing one. As I say, we have not yet been successful in showing the traction company that this is the only system.

Now, the main electrical point in the system is your voltage. If we can get the voltage low enough we may put the conductor on the surface of the street as Mr. Edison proposed some time ago.

There are various methods of producing low voltage, and one of them is the method which has been adopted by the General Electric Company recently to supply the ordinary overhead trolley system. It consists in applying the three wire system to the electric railroad, and it can be very readily applied to conduit construction.

But we have a most promising

thing in the alternating system. We can reduce from 10 volts to one-tenth or from 10,000 volts to 100 volts, but the question again has been the motor. We can use a single phase or multiphase system, and we can put upon the car a synchronous motor. This synchronous motor is operated continuously, and when the car is doing no work is taking practically very little current. To connect and disconnect the motor from the axle we can get up some mechanical gear to reduce or connect this kind of motor to the axle. We may also, perhaps, devise a hydraulic gearing, or a third system appears to me which seems to be very promising, and it consists in putting in a pneumatic gear between motor and axle. That seems very much like the system of Mr. Patton out West, where he runs a gas engine, a storage battery by a dynamo and then runs an electric motor. Now, I think we can use one of these gears, either the pneumatic, the hydraulic or the purely mechanical; but if neither of these should be successful, we may be successful in another way; we can use the triphase system and put in induction motors on the car and have two wires as before, the third one being the structure; the induction motor taking the current from the two wires and from the structure, and being connected to the axle of the car through gears and being regulated and operated by the usual forms of regulating device for such motors.

Mr. H. Ward Leonard, of this city, proposed to take a synchronous motor with a single or multiphase system, operating the synchronous motor continuously, having the synchronous motor act as a motor generator and transforming the alternating current into a constant current which is used on the motors of the cars, which you see could be very readily done, and by these means we have the various advantages of Mr. Leonard's system.

In conclusion I would say that I believe, as I have repeatedly said, that we can solve this problem. I have shown you some of the ways in which it has been attempted to solve it, and some of the ways in which it may be solved. We have got to have an underground or conduit system for our large cities where they will not let us use a trolley, and from the fact that at least three companies, three large corporations that I know of, are trying the ordinary open slot conduit, I think we will shortly see something in actual operation.

But before closing I want to afford you more or less of a treat. This system which I show you here is a system a stretch of which will be installed upon the Lenox avenue cable road of the Metropolitan Traction Company. It has been devised by the engineers of the General Electric Company, has been approved by their most eminent men and contains various features, some of which I have already described. The ordinary conduit yoke is taken, and at the manholes, 30 feet apart, placed upon suitable supports, insulators which are of rectangular form are located. They are supported in cups and embedded in sulphur; these insulators are of soapstone, and fastened to the top is an arm of iron. There being two conductors used there is no structural return. To this arm is fastened the contact conductor which is of channel iron. The contact shoe comes down through the slot and has two arms which press outwardly from the center supporting the bar against the contact rails, making a continuous rubbing contact. As you see, the insulators are located in the manholes and are easily accessible; they are quite some distance apart and the voltage, last of all, is low, it being intended to use about 250 to 300 volts. I want to point out the fact, without criticism, that the conductors are very nearly directly below the slot, which was apparently the objection in some of the first systems, but the peculiar construction and location of the insulators on this system may prevent any trouble from this source.

The discussion which followed was long and was participated in by Messrs. Wolcott, Stetson, Mailloux, Fairchild, Lundell, Field and Merrill.

ELECTRIC LIGHT FLASHES.

St. John, N. B., had no street lights on the night of November 6, the severe storm having blown down the electric light wires.

The electric light company's plant at Portland, Me., was damaged to the extent of $100,000 by fire and water early in the morning of November 7.

The Chattanooga, Tenn., Electric Light Company, which is now in the hands of a receiver, will be foreclosed by the bondholders on November 22. It is more than likely that it will be bought in by the General Electric Company, which, it is said, holds a majority of the bonds.

A fierce fire, fanned by a 40 mile "northwester," destroyed the electric light plant at Hackensack, N. J., at five o'clock in the morning on November 6. The loss on the plant is about $25,000; insurance, $18,000. The company had new machinery in motion to furnish street lights within 36 hours.

Royal Telephonists.

The telephone line between Vienna and Berlin will be opened this week. Emperor Francis Joseph will speak the first message and Emperor William will be at the Berlin end of the line to answer it.

Mr. S. S. Stiness, general manager of the Pawtucket, R. I., Gas Company, was run over by a train and killed last week.

How Shall He Fix It?

TO THE EDITOR OF ELECTRICAL REVIEW:

I have a two cell "C. & C." battery for running the motor of a sewing machine. I am told that I can use it for an electric light to suspend over my typewriter. If you could give me any hints I would be greatly obliged. I see your paper regularly, but am not "up" in practical electricity.

Yours very truly,
W. P. POND.

New York, November 7, 1894.

The Metropolitan Telephone Company, 18 Cortlandt St., offers New York City Exchange service at $80 per year upward, according to use, Metallic Circuit Line; Full Long Distance Equipment.

MY WIFE CANNOT SEE HOW YOU DO IT AND PAY FREIGHT.

$14 Buys our 2 drawer walnut or oak Improved 1ligh Arm Singer sewing machine finely finished, nickel plated, adapted to light and heavy work; guaranteed for 10 Years; with Automatic Bobbin Winder, Self-Threading Cylinder Shuttle, Self-Setting Needle and a complete set of Steel Attachments; shipped any where on 20 Day's Trial. No money required in advance. $5,000 now in use. World's Fair Medal awarded machine and attachments. Buy from factory and save dealer's and agent's profits. FREE Cut This Out and send to-day for machine or large free catalogue, testimonials and Glimpses of the World's Fair.
OXFORD MFG. CO. 342 Wabash Ave. CHICAGO, ILL.

RAILS—FOR SALE

These selected second-hand T Rails in good condition to relay:

60 lb. Steel, Western Pennsylvania or Eastern Ohio delivery.
20 lb. Steel, Northern Pennsylvania delivery.

If you can use any of the above, or any second-hand 30 lb. Iron Rails, for Pennsylvania delivery, write us. We sell new Steel Rails.

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THE PINTSCH GAS LIGHTING SYSTEM

Has been adopted as the STANDARD LIGHT by the Broadway and Third Avenue Cable Lines, of New York City; the North and West Chicago Cable Lines, and the Columbus Central Electric Line, of Columbus, O., also by sixty of the most prominent railways and by the Pullman and Wagner Palace Car Companies in the United States.

It has been the standard lighting system in Europe for many years, and is applied to 55,000 cars in Europe, the United States, South America, India and Australia.

For particulars, address

THE SAFETY CAR HEATING AND LIGHTING COMPANY,
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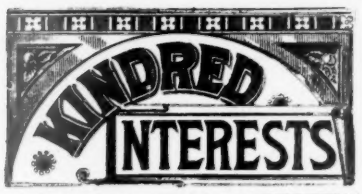

The Partridge Carbon Company, Sandusky, Ohio, have issued a handy pocket catalogue of their well-known self-lubricating dynamo and motor brushes. A large selection of styles and sizes is offered.

Kerite wires and cables continue to enjoy their well-known popularity. Some nice orders have recently found their way to Mr. W. R. Brixey, the manufacturer of Kerite, 203 Broadway, New York city.

They have a nice lot of Fidelity carbons and imported cored carbons down at the Electric Construction and Supply Company's warerooms, 18 Cortlandt street, New York city. Those that need carbons would do well to ask about the prices on this lot.

The Electric Construction and Supply Company, 18 Cortlandt street, New York city, have issued a handsome pamphlet from the press of Bartlett & Company, describing and illustrating their new direct current arc lamps, single and "twin," for any pressure above 60 volts.

Frank H. Stewart, importer and manufacturer of and dealer in electrical supplies, has recently had such an increase of business that he has been obliged to move from 41 North Seventh street to larger quarters at 20 North Seventh street, Philadelphia. Note the new address.

James Smith & Company, 411 to 421 Race street, Philadelphia, are sending out a little reminder that there is no better packing than the "National," which they manufacture. "National" packing has a flat or rectangular shaped rubber core of superior quality and is made wholly of the best materials and lubricants.

The Interior Telephone Company, 203 Broadway, New York city, has prepared a neatly printed and well illustrated booklet describing the Colvin telephone system for local, long distance and interior work. This system is in successful operation in a large number of buildings in most of the more important cities.

The Metropolitan Electric Company, 186 and 188 Fifth avenue, Chicago, Ill., have issued a wonderfully complete and comprehensive catalogue of electric railway supplies and materials. A convenient cipher for ordering by telegraph is included in the book. This company is also sending out a pocket catalogue of porcelain insulators of their own manufacture.

The Shawmut Fuse Wire Company, 161 High street, Boston, Mass., are sending out a catalogue and price list of their high grade fuse wire and fuse links. This was the first tested fuse wire offered to the electrical trade, and has held its place as the most accurate and trustworthy in the market. The care used in its manufacture, its superior quality and its thorough testing by the Massachusetts Electrical Engineering Company have made a foremost place for it.

The Mather Electric Company, of Manchester, Conn., report the following sales of apparatus for the month of October. The company now has orders ahead for three months and is operating its entire plant overtime until 10 o'clock every night:

Hartford and West Hartford Street Railway Co., Hartford, Conn. (2d order), 180 kilowatt 500 volt generator; Hartford and West Hartford Street Railway Co., Hartford, Conn. (3d order), 180 kilowatt 500 volt generator; Bloomington City Railway Co., Bloomington, Ill., 100 kilowatt 300 volt generator; Amory Manufacturing Co., Manchester, N. H., 80 kilowatt 190 volt generator; Charles R. Lewis Clothing Manufacturing Co., Belleville, Ill., 30 kilowatt 120 volt generator; Stamford Hotel, Chicago, Ill., 45 kilowatt 120 volt generator; John Jermyn, Scranton, Pa., 100 kilowatt 300 volt generator; Southwest Virginia Improvement Co., Pocahontas, Va., 60 kilowatt 220 volt generator; Somers Fuel Co., Belle Vernon, Ohio, 60 kilowatt 22 volt generator; J. Holt Gates, Chicago, Ill., 60 kilowatt 220 volt generator; J. Holt Gates, Chicago, Ill., 30 kilowatt 120 volt generator; J. Holt Gates, Chicago, Ill., 100 kilowatt 500 volt generator; Burtis & Howard, Minneapolis, Minn., 11 kilowatt 220 volt dynamo; Stanley Electric Co., Pittsfield, Mass., 2 kilowatt Manchester exciter; Jones & Lamson Machine Co., Springfield, Vt., 250 light dynamo; Warren Shaw & Co., South Peabody, Mass., 250 light dynamo; Lewis Anderson & Co., Skowhegan, Me., 600 light dynamo; George Pappert Manufacturing Co., North Milwaukee, Wis., 150 light dynamo; H. B. Coho, New York city, 450 light dynamo; Cobb, Bates & Yexra, Fall River, Mass., 600 light dynamo; Chambers Electric Light and Power Co., Truro, N. S. (6th order), 600 light dynamo; Ohio State University, Columbus, Ohio (2d order), 15 horse-power Manchester motor; Sheriff of Hampden County, Springfield, Mass., 3 horse power Manchester motor; Ætna Electric Works, Hartford, Conn., 6 horse-power Manchester motor; Charles R. Lewis Clothing Manufacturing Co., Belleville, Ill., 3 horse-power Manchester motor; Harry S. Anderson, Springfield, Mass., 600 ampere special dynamo. Shipments consisting of further October orders and former orders: Bartram Hotel, Philadelphia, Pa., two 45 kilowatt direct connected machines; New Pittsburgh Coal Co., New Pittsburgh, Ohio, 60 kilowatt 220 volt generator; Morris Coal Co., Sand Run, Ohio, 60 kilowatt 220 volt generator; Henry R. Worthington & Co., Brooklyn, N. Y., 45 horse-power 220 volt generator; Jones Bros. Electric Co., Cincinnati, O. (7th order), 50 horse-power 220 volt generator; Connecticut River Paper Co., Holyoke, Mass., 700 light dynamo; Grenada Hotel, Chicago, Ill., 450 light dynamo; Leafe Bros., Winchester, Va., 50 light dynamo; Major & Loomis, Hertford, N. C., 25 light dynamo; George W. Furbeck, Chicago, Ill., 250 light dynamo; Badger Lumber Co., Kansas City, Mo., 100 light dynamo; Henry R. Worthington & Co., Brooklyn, N. Y., 600 light dynamo; Diamond Machine Co., Providence, R. I., 250 light dynamo; North Package and Provision Co., Somerville, Mass. (3d order), 1,000 light dynamo; H. S. Sands, Fairmont, West Va., 450 light dynamo; Earl Knitting Mill, Northville, N. Y., 75 light dynamo; Bay State Distillery Co., East Cambridge, Mass., 250 light dynamo; Phelps Publishing Co., Springfield, Mass., 20 horse-power Manchester motor; Machinery Supply Co., Los Angeles, Cal., 5 horse-power Manchester motor; Connecticut River Paper Co., Holyoke, Mass., two 15 horse-power Manchester motors; Meriden Britannia Co., New York city (2d order), 3 horse-power Manchester motor; Machinery Supply Co., Los Angeles, Cal., 3 horse-power Manchester motor; Machinery Supply Co., Los Angeles, Cal., 10 horse-power Manchester motor; B. F. Sturtevant & Co., Chicago, Ill., 10 horse-power Manchester motor; Electric Construction and Engineering Co., Detroit, Mich., 3 horse power Manchester motor.

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Dynamos and Motors AND PARTS OF SAME
ALL KINDS PRICES OF PARTS TELEPHONES ELECTRICAL SUPPLIES
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Will outlast anything in the market.
Write for prices.
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Send for Illustrated Catalogue.

ROYCE & MAREAN,
DEALERS IN
Electrical Supplies,
WASHINGTON, D. C.

Sight Feed Oil Cups.
AUTOMATIC "WIPING DEVICE"
For oiling Crank and Cross-head Pins.
WM. H. WILKINSON,
352 Atlantic Ave., Boston, Mass.

Receiver's Sale.

United States Circuit Court for the Southern District of New York. Charles F. Oxley, Complainant, against The Archer & Pancoast Manufacturing Company, defendant. Carlos French, Complainant, against The Same. Consolidated Causes in Equity.

The undersigned, Receivers of all the property, assets and effects of the said corporation, the Archer & Pancoast Manufacturing Company, will sell at public auction, pursuant to a decree and order of this court made and entered herein and bearing date the 19th day of October, 1894, at the Real Estate Exchange, No. 111 Broadway, in the City of New York, by George R. Read, auctioneer, on Thursday, the 15th day of November, 1894, at twelve o'clock noon of that day, in one lot or parcel, and not divided or separated, all the property, both real and personal, and all the rights, choses in action and effects of said corporation, said property being described as follows:

All that certain piece or parcel of land with the buildings erected thereon, situate, lying and being in the Twentieth Ward of the City of Brooklyn, County of Kings, and State of New York, and bounded and described as follows, to wit: Beginning at the point formed by the intersection of the southerly line of Flushing avenue with the easterly side of Carlton avenue, and running thence southerly along the easterly side of Carlton avenue one hundred and fifty feet and three inches (150 ft. 3 in.); thence easterly and at right angles with Carlton avenue forty-five feet and four inches (45 ft. 4 in.); thence southwardly along the land formerly of Sarah Ryerson and nearly parallel with Carlton avenue one hundred feet (100 ft.) more or less to a line drawn at right angles with Carlton avenue through a point in the easterly line thereof, distant two hundred and fifty feet and three inches (250 ft. 3 in.); southwardly from the southeasterly corner of Flushing and Carlton avenues, and to land now or late of Elizabeth Atthisar; thence eastwardly along said last mentioned land and line one hundred and twelve feet and three and one-half inches (112 ft. 3½ in.) to land now or late of Henry L. Clark; thence northerly along said last mentioned land and parallel, or nearly so, with Carleton avenue two hundred and seventeen feet and two inches (217 ft. 2 in.) to a point in the southerly line of Flushing avenue, distant forty feet and ten inches (40 ft. 10 in.), more or less, westwardly from the southwestwardly corner of Flushing avenue and Adelphi street; and thence westwardly along the southerly line of Flushing avenue one hundred and sixty-three feet and five inches (163 ft 5 in.) to the point or place of beginning.

And also all that certain lot, piece or parcel of land situate, lying and being in the said City of Brooklyn, bounded and described as follows: Beginning at a point on the southerly side of Flushing avenue twenty feet and five inches (20 ft. 5 in.) westerly from Adelphi street; running thence westerly along Flushing avenue about twenty feet and five inches (20 ft. 5 in.) to land formerly of Phebe Kissam; thence southerly along Kissam's land about eighty-six feet and two inches (86 ft. 2 in.) to land heretofore conveyed by Henry L. Clarke and wife to Edward Marrin; thence easterly along said Marrin's land at right angles to Adelphi street about twenty feet and four inches (20 ft. 4 in.) to land formerly of James Traynor; thence northerly along said Traynor's land and parallel with Adelphi street about eighty-two feet and ten inches (82 ft. 10 in.) to the place of beginning.

And also all those two certain lots of land situate, lying and being in said City of Brooklyn, and bounded and described as follows: Beginning on the westerly side of Adelphi street at the northeasterly corner of a piece of land heretofore conveyed by Henry L. Clarke and wife to William E. Winant, which corner is two hundred and twenty feet and eight inches (220 ft. 8 in.) south of Flushing avenue; running thence northerly along Adelphi street thirty-nine feet and six inches (39 ft. 6 in.) to land formerly of A. McNeely, as conveyed to him by said Henry L. Clarke by deed recorded in Lib. 822 of Cons., page 464; thence westerly at right angles to Adelphi street and along said McNeely's land about forty-two feet five inches (42 ft. 5 in.) to land formerly of Phebe R. Kissam; thence southerly along said Kissam's land and nearly parallel with Adelphi street about thirty-nine feet and six inches (39 ft. 6 in.) to said Winant's land at a point continuous of a line drawn at right angles to Adelphi street from the place of beginning; thence easterly along such continuous line at right angles to Adelphi street about forty-two feet and six inches (42 ft. 6 in.) to Adelphi street at the place of beginning.

Together with all the right, title and interest of the said corporation, if any, in and to Flushing and Carlton avenues and Adelphi street, lying opposite to said premises, to the center of said avenues and street respectively.

Said four lots above described being covered by a mortgage for $55,000, made by Charles F. Oxley and others to John W. Hunter and another, as Trustees, and recorded in the Register's Office of Kings County, November 12th, 1887, in Liber 1950 of Mortgages, page 327, with interest at five per centum per annum from the 2d day of June, 1894.

And also all and singular the machinery, utensils, tools, implements, boilers, engines, stock, manufacturing materials, models, patterns, merchandise, fixtures, book accounts, claims, things in action, good will, trade mark, name or names, patents, letters patent, invention and patent rights and interest therein, and all rights, property, assets and effects of every kind and nature whatsoever of the said corporation, the Archer and Pancoast Manufacturing Company.

N. B.—No bid therefor for a less sum than $600,000 will be received, and fifty thousand dollars must be paid in cash by the purchaser at time of sale, and the balance of the purchase money within thirty days thereafter.

Dated New York, October 22d, 1894.
ARCHER V. PANCOAST,
ALANSON T. ENOS,
Receivers.

DAVIES, STONE & AUERBACH,
Attorneys for Receivers,
32 Nassau Street, N. Y.

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